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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,639	02/08/2002	Kyoungsik Yu	S00-224	3278

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LUMEN INTELLECTUAL PROPERTY SERVICES, INC.
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EXAMINER

STAHL, MICHAEL J

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 03/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/072,639

Applicant(s)

YU ET AL.

Examiner

Mike Stahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-78 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 25-78 is/are allowed.
- 6) ☒ Claim(s) 1,2,13,16,17,23 and 24 is/are rejected.
- 7) ☒ Claim(s) 3-12,14,15 and 18-22 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/8/2002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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Information Disclosure Statement

The references submitted February 8, 2002 have been considered. An initialed copy of form PTO-1449 is attached.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 13, 16-17, and 23-24 are rejected under 35 U.S.C. 102(a) as being anticipated by Madsen et al. (article in Photonics Technology Letters, vol. 12 no. 6, June 2000).

Claim 1: Madsen discloses an optical device (fig. 1) comprising: a partially reflecting reflector (the multi-layer stack on the bottom of the silicon substrate, which has a reflectivity of at least about 97 %); a movable mirror (the silicon nitride membrane) spaced apart from the reflector which is movable to vary the spacing between itself and the reflector; and a light collimator for projecting a light beam between the mirror and the reflector at an oblique angle (see the description of the single-stage filter package, first full paragraph in the right column of p. 651).

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Claim 13: In an exemplary embodiment the free spectral range is 100 GHz. At a central wavelength of 1550 nm, the equivalent free spectral range in terms of wavelength is 0.8 nm, which is within the recited range.

Claim 16: The nominal spacing between the mirror and the reflector is $\frac{3}{4} \lambda$, which for $\lambda=1550$ nm works out to 1162.5 nm.

Claim 17: The reflector has a uniform reflectivity.

Claim 23: The reflector and the movable mirror are planar parallel when the movable mirror (the silicon nitride membrane) is in the undeflected state.

Claim 24: The reflector and the movable mirror are not entirely parallel when the movable mirror membrane is in the deflected state.

Claims 1 and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Paiam (US 6252716).

Claim 1: Paiam discloses an optical device (fig. 3) including: a partially reflecting, partially transparent reflector (the back mirror of either Gires-Tournois cavity **22/24**, which has a reflectivity of 99.9 % in the fig. 1 example); a movable mirror (the front facet of the cavity) spaced apart from the reflector and movable to vary the spacing between itself and the reflector (see claims 1-3 and the description associated with the tunable modification of figs. 11 and 12); and a collimator **30** which projects a light beam at an oblique angle between the mirror and the reflector.

Claim 23: The reflector and the movable mirror are planar parallel.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Madsen et al. (cited above).

Claim 2: Madsen mentions an incidence angle of about 0.6 degrees, which is slightly outside the claimed range. However, it would have been obvious to a skilled person to design a given package with any small incidence angle which satisfies the stated goals of minimizing the walkoff and the polarization dependent loss. The incidence angle would depend on the particular implementation of the package, so it is conceivable that some package embodiments would require an incidence angle of about 1 degree or more.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Allowable Subject Matter

Claims 3-12, 14-15, and 18-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 25-78 are allowed.

As to claims 3, 10, and 55, neither applied reference teaches or suggests an array of separately movable micromirrors. Each reference uses only a single movable mirror, and only one reflection from that mirror. There is no apparent need to have an array of mirrors. Claims 4-8, 11-12, and 56-78 are depend from claims 3, 10, and 55 respectively.

As to claim 14, neither reference discloses or suggests specifically setting the free spectral range of the device to an integer multiple of the beam bandwidth.

As to claim 15, as noted above the light beam reflects from the mirror only once, not multiple times in different positions on the mirror as claimed.

As to claim 18, neither reference teaches or suggests providing the reflector with a nonuniform reflectivity. Claim 19 depends from claim 18.

As to claim 20, neither reference teaches or suggests including a spatial light modulator on the side of the reflector opposite the mirror side.

As to claim 21, neither reference discloses or suggests a convex area on the movable mirror for focusing the light beam. There does not appear to be any need for additional focusing in the disclosed devices.

As to claim 22, the applied references fail to disclose or suggest having the reflector include a light valve having a variable reflectivity.

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As to claim 25, the applied references do not teach or suggest producing a plurality of spaced apart emergent beams by transmission of the light beam through the reflector. The device in each reference is set up to receive a single reflected beam at one location. There is no provision for dealing with multiple spaced apart emergent beams. Claims 26-54 are allowable at least by dependence from claim 25.


Conclusion

The following references are considered pertinent to applicant's disclosure and are cited on the attached PTO-892 form: US 2003/0035216, US 2003/0021525, US 5071225, US 6292298.

Any inquiry concerning this communication should be directed to Mike Stahl at (571) 272-2360. Official communications which are eligible for submission by facsimile and which pertain to this application may be faxed to (703) 872-9306. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the Technology Center 2800 receptionist at (703) 308-0956 or to the technical support staff supervisor at (703) 308-3072.

MJS

Michael J. Stahl
Patent Examiner
Art Unit 2874


AKM ENAYET ULLAH
PRIMARY EXAMINER

March 2, 2004